

Remarks

This amendment is in response to the Office Action dated September 25, 2002. Claims 1, 5, 8, 17, 20 and 22 have been amended and new claims 24-25 have been added. Claims 21 and 23 have been canceled without prejudice. Claims 1-20, 22 and 24-25 are currently pending. Reexamination and reconsideration are respectfully requested.

Applicant has amended the title in a manner similar to that suggested by the Examiner.

Applicant proposes to amend Fig. 4 as indicated in red on the attached sheet to include reflection prevention film 99. Support for the amendment may be found in the specification at, for example, page 10, line 28. Applicant will submit a new formal drawing if the proposed amendment is approved.

Applicant has corrected typographical errors in claims 17 and 20 as suggested by the Examiner. Applicant has also amended to specification at pages 10-11 to insert reference number 99 to indicate the reflection prevention film. No new matter has been entered.

Claims 5-7, 12-16 and 23 were rejected under 35 U.S.C. 112, second paragraph as being indefinite. Applicant respectfully traverses the rejection. Applicant does not agree that the claims are indefinite but to expedite prosecution applicant has amended claim 5 to delete the term "through" from lines 2 and 5 and insert the terms "and above" in its place to make clear to position of the layers.

The Examiner specifically addressed claims 5, 6 and 13 and stated that "it is clear from the figures that the second interlayer insulating layer is not formed on the second region." However, applicant respectfully submits that the description and Figures make clear that in certain embodiments the second interlayer insulating layer is formed on the second region as recited in these claims. Applicant notes that Fig. 2(b) and its description in the specification at page 6 provides support. Fig. 2(b) illustrates an embodiment in which wiring layers 30, 32 and 40 and interlayer insulation layers 20, 22 and 24 are specified. Applicant submits that the embodiment illustrated in Fig. 2(b) provides adequate support for these claims. The specification at page 6, lines 10-15, describes the formation of a first region on an upper surface of insulation layer 20 above which a protective layer 50 is formed, and a second region above which a pad

opening section 60 is formed. These regions as described in the specification provide support for claims 5, 6 and 13.

As seen in Fig. 2(b) the protective layer 50 is formed to extend over a portion of the insulation layers 20, 22 and 24. Applicant respectfully submits that this provides adequate support for "an upper surface of the first interlayer insulation layer includes a first region where the protective insulation layer is formed vertically thereabove, and the first wiring layer is formed on the first region" as recited in claim 5. In addition, Fig. 2(b) also illustrates a pad opening section 60 formed over another portion of the insulation layers 20, 22, and 24. Applicant respectfully submits that this provides adequate support for "the upper surface of the first interlayer insulation layer further comprises a second region where the pad opening section is formed vertically thereabove, and at least part of the second interlayer insulation layer is formed on the second region" as recited in claim 6. In addition, applicant also notes that the wiring layers 30 and 32 in Fig. 2(a) appear to be located at positions that correspond to the first region (which has the protective layer 50 extending thereover), and thus are "only formed on the first region" as recited in claim 13. Furthermore, the interlayer insulation layers 22 and 24 appear to be located at positions that correspond to the second region (which has the pad opening 60 formed thereabove), and thus they are "formed over the entire second region" as recited in claim 13.

Accordingly, for at least the above reasons, applicant respectfully submits that claims 5-7, 12-16 and 23 comply with section 112.

Claims 1-20 were rejected under 35 U.S.C. 102(b) and/or 35 U.S.C. 103(a) as unpatentable over U.S. Patent No. 5,149,674 to Freeman, Jr., U.S. Patent No. 5,736,791 to Fujiki et al., U.S. Patent No. 6,362,528 to Anand, U.S. Patent No. 6,197,685 to Domae et al., either alone or in various combinations. Applicant respectfully submits that these rejections have been rendered moot as explained below. Applicant has amended independent claims 1, 5, 8 and 17. Applicant respectfully submits that the rejections of claims 1-20, as amended, are patentable over the cited art for at least the reasons discussed below.

Claims 21-23 were rejected under 35 U.S.C. 103(a) as unpatentable over Fujiki et al. Claims 21 and 23 have been canceled without prejudice as similar subject matter was incorporated into other claims. Claim 22 was amended to depend from claim 17. Independent

claims 1, 5, 8, and 17 have all been amended to include an element relating to a "reflection prevention film". Applicant respectfully submits that claims 1-20 and 22 are patentable over Fujiki and the other cited art for at least the reasons discussed below.

The Examiner stated at page 9 of the Office Action that "the addition of another element in Applicant's claimed invention of claims 5 and 17 cannot make the device patentable unless it performs new or surprising function." Applicant respectfully submits that the Examiner's statement regarding patentability does not appear to be consistent with the current federal circuit law. However, it should be noted that the use of a "reflection prevention film" does perform a new function in that its use prevents reflections that may lead to processing problems. Thus, even if the Examiner's legal rationale were correct (which Applicant does not concede) the rejection should be withdrawn.

Moreover, according to the MPEP, to establish a prima facie case of obviousness, the following criteria should be met. First, there should be a suggestion or motivation in the art to modify the reference or to combine reference teachings. Second, there should be a reasonable expectation of success. Third, the reference(s) must teach all the claim limitations. MPEP section 706.02(j). Applicant respectfully submits that the Examiner's citations are insufficient to satisfy the criteria above and accordingly, the rejection of claim 22 should be withdrawn. Moreover, for at least the same reasons as claim 22, claims 1, 5, 8 and 17 and their dependent claims are patentable over the cited art.

Accordingly, for at least the above reasons, the rejections of claims 1-20 and 22 should be withdrawn.

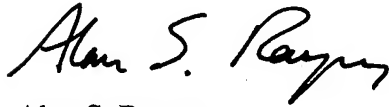
New dependent claims 24-25 were added. Support for the claims may be found throughout the specification and in the original claims. It is believed that no new matter has been entered. Examination is respectfully requested.

Attached hereto is a marked-up version of the claim changes made by the present amendment. The attached page is captioned "Version with markings to show changes made."

Applicant respectfully submits that claims 1-20, 22 and 24-25 are in patentable form. Reexamination and reconsideration are respectfully requested. If, for any reason, the application

is not in condition for allowance, the Examiner is requested to telephone the undersigned to discuss the steps necessary to place the application into condition for allowance.

Respectfully submitted,



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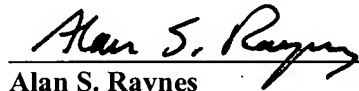
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Alan S. Raynes

Feb. 25, 2003
(Date)

Version With Markings to Show Changes Made

The paragraph starting at page 10, line 28 and ending at page 11, line 4, was amended as follows:

--(5) A reflection prevention film 99 may be formed on the third wiring layer 40. It is noted that, when a reflection prevention film 99 is formed, the reflection prevention film 99 at the pad opening section 60 may preferably be removed in order to improve the coherency between bonding structures (for example, bonding balls, bumps, etc.) and the third wiring layer 40. The reflection prevention film 99 may be formed from, for example, a titanium nitride film. The thickness of such a titanium nitride film is, for example, 20 – 80 nm.--

Claims 1, 5, 8, 17, 20 and 22 were amended as follows:

1. (amended) A semiconductor device comprising:
a protective insulation layer;
a pad opening section provided in the protective insulation layer;
a wiring layer which the pad opening section reaches;
a reflection prevention film on at least a portion of the wiring layer that the pad opening section reaches; and
a wiring layer provided at a level lower than the wiring layer which the pad opening section reaches,
wherein the wiring layer provided at a level lower than the wiring layer which the pad opening section reaches is formed outside a region of the pad opening section as viewed in a plan view.

5. (amended) A semiconductor device comprising:
a first wiring layer formed above a semiconductor layer and above [through] a first interlayer insulation layer;

a second wiring layer that [provides] includes a pad section formed above the first wiring layer and above [through] a second interlayer insulation layer;

a reflection prevention film on at least a portion of the second wiring layer;

a protective insulation layer formed above the second wiring layer and the second interlayer insulation layer; and

a pad opening section provided in the protective insulation layer,

wherein an upper surface of the first interlayer insulation layer includes a first region where the protective insulation layer is formed vertically thereabove, and the first wiring layer is formed on the first region.

8. (amended) A method for manufacturing a semiconductor device, the method comprising the steps of:

(a) forming a wiring layer on an interlayer insulation layer and a reflection prevention film on the wiring layer;

(b) forming a protective insulation layer on the interlayer insulation layer and over the wiring layer and the reflection prevention film; and

(c) forming a pad opening section in the protective insulation layer and the reflection prevention film, which reaches the wiring layer,

wherein the semiconductor device includes a wiring layer provided at a level lower than the wiring layer to which the pad opening section reaches,

wherein the pad opening section is formed such that the wiring layer provided at a level lower than the wiring layer to which the pad opening section reaches is formed outside a region of the pad opening section as viewed in a plan view.

17. (amended) A method for manufacturing a semiconductor device, comprising:
forming a lower level wiring layer;
forming [an] a lower level interlayer dielectric layer on and adjacent to the lower level wiring layer;

forming an upper level wiring layer above the lower level interlayer dielectric layer, wherein the lower level wiring layer is electrically connected to the upper level wiring layer;

forming a reflection prevention film on the upper level wiring layer;
 forming a protective insulation layer on the upper level wiring layer;
 removing a first portion of the protective insulation layer over the upper level wiring layer and over the lower level interlayer dielectric layer to form a pad opening section [of the upper level wiring layer,];

wherein a second portion of the protective insulation layer located vertically above the lower level wiring layer remains after removing the first portion of the protective layer; and

wherein no portion of the lower level wiring layer is disposed vertically below the pad opening section.

20. (amended) A method as in claim 18, further comprising:

forming the lower level wiring layer to be electrically connected to the intermediate level wiring layer;

forming the intermediate level wiring layer to be electrically connected to the upper level wiring layer;

forming the lower level wiring layer to include [has] a thickness that is less than that of the lower level interlayer dielectric layer;

forming the intermediate level wiring layer to include a thickness that is less than that of the intermediate level interlayer dielectric layer;

forming a plurality of lower level plugs to electrically connect the lower level wiring layer to the intermediate level wiring layer;

forming a plurality of intermediate level plugs to electrically connect the intermediate level wiring layer to the upper level wiring layer; and

wherein the intermediate plugs are formed to be offset from the lower level intermediate plugs in a vertical direction.

22. (amended) A method as in claim [21] 17, further comprising removing the reflection prevention film from the pad opening section of the upper level wiring layer.



Fig. 3

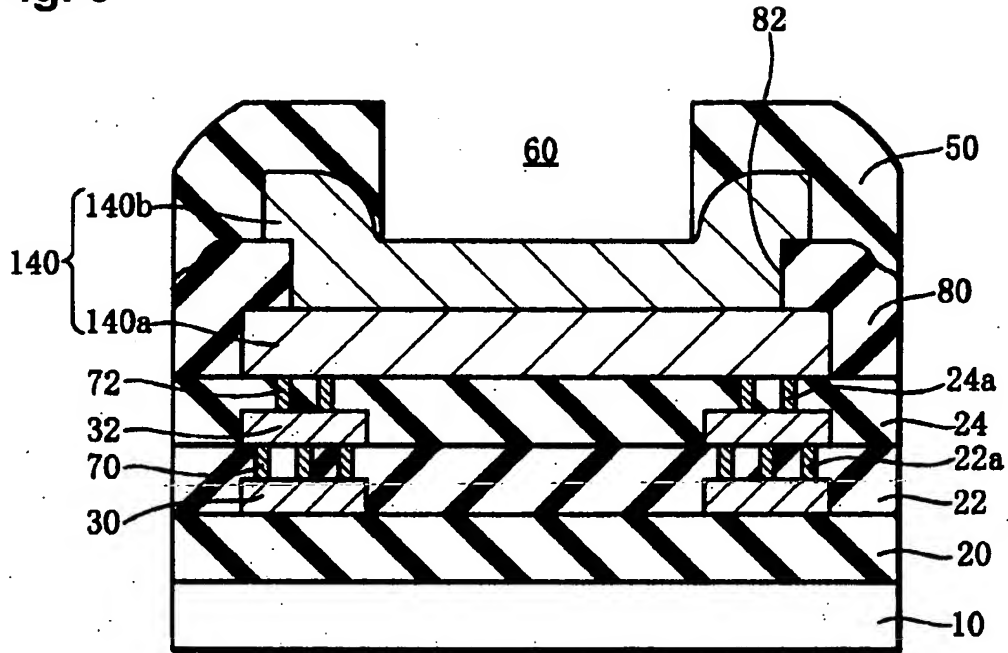


Fig. 4

Approved, RP
3/14/03

